

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A tri-level decoder circuit comprising:
  - a first decoder circuit that is coupled between an input node and a first output node, wherein the first decoder circuit includes:
    - a first switch circuit that is coupled to the input node;
    - a current source circuit coupled to the first output node; and
    - a first current mirror circuit that is coupled between the first switch circuit and the first output node; and
  - a second decoder circuit that is coupled between the input node and a second output node, wherein
    - the second decoder circuit includes:
      - a second switch circuit coupled to the input node;
      - a second current source circuit coupled to the second switch circuit; and
      - a second current mirror circuit coupled between the second switch circuit and the second output node; and
    - a current source circuit coupled to the first output node.
2. (Currently amended) A tri-level decoder circuit comprising:
  - a first decoder circuit that is coupled between an input node and a first output node, wherein the first decoder circuit includes:
    - a first switch circuit that is coupled to the input node; and
    - a first current mirror circuit that is coupled between the first switch circuit and the first output node; and
  - a second decoder circuit that is coupled between the input node and a second output node, wherein the second decoder circuit is separate from the first decoder circuit, and wherein the first current mirror circuit is configured to:
    - receive a first switch current from the first switch circuit; and

reflect the first switch current to provide a first reflected current at the first output node in accordance with a ratio that is greater than one-to-one.

3. (Currently amended) A tri-level decoder circuit comprising:

a first decoder circuit that is coupled between an input node and a first output node, wherein the first decoder circuit includes:

a first switch circuit that is coupled to the input node; and

a first current mirror circuit that is coupled between the first switch circuit and the first output node, wherein the first current mirror includes a plurality of p-type transistors; and

a second decoder circuit that is coupled between the input node and a second output node, wherein the second decoder circuit includes a second current mirror circuit, the second current mirror circuit includes a plurality of n-type transistors, the first decoder circuit further includes a first current source circuit coupled to the first switch circuit, the first current source circuit and the first current mirror circuit are separate circuit elements, and

wherein the first switch circuit is configured to:

if a control voltage exceeds a low threshold

reduce a resistance between a first port of the first current mirror circuit and the first current source circuit;

else

isolate the first port of the first current mirror circuit from the first current source circuit.

4. (Previously Presented) The tri-level decoder circuit of Claim 3, wherein the first current source circuit comprises at least one of a transistor or a resistor.

5. (Previously Presented) The tri-level decoder circuit of Claim 1, wherein the first decoder circuit further includes another current source circuit coupled to the first switch circuit.

6. (Previously Presented) The tri-level decoder circuit of Claim 5, wherein the first decoder circuit further comprises:
  - a first current branch including the other current source circuit and the first switch circuit; and
  - a second current branch including the current source circuit and the output node, and wherein the first current mirror circuit includes at least one component in each of the first and second current branches.
7. (Currently amended) A tri-level decoder circuit comprising:  
a first decoder circuit that is coupled between an input node and a first output node, wherein the first decoder circuit includes:  
    a first switch circuit that is coupled to the input node;  
    a current source circuit coupled to the first output node; and  
    a first current mirror circuit that is coupled between the first switch circuit and the first output node; and  
    a second decoder circuit that is coupled between the input node and a second output node;  
andThe tri-level decoder circuit of Claim 1, further comprising:  
    a driver circuit that is coupled to a control node associated with the input node, wherein the driver circuit is configured such that  
        if the input node does not receive a driving input signal, the driver circuit actively drives the control node.
8. (Original) The tri-level decoder circuit of Claim 7, wherein the driver circuit comprises two current sources and two transistors, wherein each of the two transistors is configured to operate as a diode.
9. (Original) The tri-level decoder circuit of Claim 7, further comprising:

a low-pass filter circuit that is coupled between the control node and the input node.

10. (Previously Presented) A tri-level decoder circuit comprising:

a first decoder circuit that is coupled between an input node and a first output node, wherein the first decoder circuit includes:

a first switch circuit that is coupled to the input node; and

a first current mirror circuit that is coupled between the first switch circuit and the first output node;

a second decoder circuit that is coupled between the input node and a second output node;

a driver circuit that is coupled to a control node associated with the input node, wherein the driver circuit is configured such that if the input node does not receive a driving input signal, the driver circuit actively drives the control node; and

a low-pass filter circuit that is coupled between the control node and the input node, wherein the low-pass filter circuit comprises:

a resistor that is coupled to the driver circuit;

a capacitor that is coupled between the resistor and a first bias node,

wherein the first decoder circuit further includes a first current source circuit coupled to the first switch circuit and the first bias node; and

another resistor that is coupled between the input node and the resistor.

11. (Currently amended) The tri-level decoder circuit of Claim 2[[1]], wherein the second decoder circuit includes:

a second switch circuit coupled to the input node;

a second current source circuit coupled to the second switch circuit; and

a second current mirror circuit coupled between the second switch circuit and the second output node.

12. (Previously Presented) A tri-level decoder circuit comprising:

a first decoder circuit that is coupled between an input node and a first output node, wherein the first decoder circuit includes:

    a first switch circuit that is coupled to the input node; and  
    a first current mirror circuit that is coupled between the first switch circuit and the first output node;

    a second decoder circuit that is coupled between the input node and a second output node, wherein the second decoder circuit includes:

        a second switch circuit coupled to the input node;  
        a second current source circuit coupled to the second switch circuit; and  
        a second current mirror circuit coupled between the second switch circuit and the second output node; and

    a capacitor that is coupled between the second output node and another node between the second current mirror and the second switch circuit.

13. (Currently amended) A tri-level decoder circuit comprising:

a first decoder circuit that is coupled between an input node and a first output node, wherein the first decoder circuit includes:

    a first switch circuit that is coupled to the input node;  
    a current source circuit coupled to the first output node; and  
    a first current mirror circuit that is coupled between the first switch circuit and the first output node; and

    a second decoder circuit that is coupled between the input node and a second output node  
The tri-level decoder circuit of Claim 1, wherein

the first decoder circuit further comprises a non-linear filter circuit.

14. (Original) The tri-level decoder circuit of Claim 13, wherein  
the non-linear filter circuit comprises a capacitor.

15. (Previously Presented) A tri-level decoder circuit, comprising:

    a first decoder circuit that is coupled between an input node and a first output node, wherein the first decoder circuit includes:

        a first switch circuit that is coupled to the input node; and

        a first current mirror circuit that is coupled between the first switch circuit and the first output node;

    a second decoder circuit that is coupled between the input node and a second output node, wherein the first decoder circuit further comprises a non-linear filter circuit;

    the non-linear filter circuit comprises a capacitor; and

    wherein the first decoder circuit further comprises a non-linear filter circuit, wherein the capacitor is coupled between the first output node and another node between the first switch circuit and the first current mirror circuit.

16. (Previously Presented) A tri-level decoder circuit comprising:

    a first decoder circuit that is coupled between an input node and a first output node, wherein the first decoder circuit includes:

        a first switch circuit that is coupled to the input node; and

        a first current mirror circuit that is coupled between the first switch circuit and the first output node; and

    a second decoder circuit that is coupled between the input node and a second output node, wherein the first decoder circuit further includes a non-linear filter circuit;

    the non-linear filter circuit includes a capacitor; and wherein the capacitor has a capacitance that is less than .5 picofarads.

17. (Previously Presented) A tri-level decoder circuit, comprising:

    a first switch circuit that is coupled to a first switch node, a first mirror node, and a control node, wherein

        the first switch circuit is configured to:

receive a control voltage at the control node;  
if the control voltage exceeds a low threshold  
    reduce a resistance between the first mirror node and the first switch node;  
else  
    isolate the first mirror node from the first switch node;  
a first current source circuit that is coupled to the first switch node;  
a first current mirror circuit that is coupled to the first mirror node and a first output node,  
wherein

the first current mirror circuit is configured to:  
    receive a first switch current at the first mirror node; and  
    reflect the first switch current to provide a first reflected current at the first output  
node according to a pre-determined ratio that is greater than one-to-one;  
    a second current source circuit that is coupled to the first output node;  
    a second switch circuit that is coupled to a second switch node, a second mirror node, and a  
control node, wherein

the second switch circuit is configured to:  
    receive the control voltage;  
    if the control voltage exceeds a high threshold  
        isolate the second mirror node from the second switch node;  
    else  
        reduce a resistance between the second mirror node and the second switch  
node; and

    a third current source circuit that is coupled to the second switch node;  
    a second current mirror circuit that is coupled to the second mirror node and a second output  
node, wherein

the second current mirror circuit is configured to:  
    receive a second switch current at the second mirror node; and

reflect the second switch current to provide a second reflected current at the second output node according to another pre-determined ratio that is greater than one-to-one; and a fourth current source circuit that is coupled to the second output node.

18. (Original) The tri-level decoder circuit as in Claim 17, further comprising:  
a capacitor that is coupled between that first mirror node and the first output node; and  
another capacitor that is coupled between that second mirror node and the second output node.
19. (Original) The tri-level decoder circuit as in Claim 17, further comprising:  
a modified wilson current mirror circuit that is coupled to a first bias node and a second bias node,  
wherein the first current source circuit comprises a first current source transistor having a gate that is coupled to the first bias node,  
the second current circuit comprises a second current source transistor having a gate that is coupled to the first bias node,  
the third current source circuit comprises a third current source transistor having a gate that is coupled to the second bias node, and  
the fourth current circuit comprises a fourth current source transistor having a gate that is coupled to the second bias node.

20. (Currently amended) A tri-level decoder circuit, comprising:  
means for comparing a voltage to a first threshold;  
means for comparing the voltage to a second threshold;  
means for providing a current in response to the first threshold comparison; and  
means for reflecting the current to provide another current; and  
means for actively driving the voltage if an input node does not receive a driving input signal.

21. (Currently amended) A tri-level decoder circuit, comprising:

    a first decoder circuit that is coupled to an input node and a first output node, wherein the first decoder circuit includes:

        a first switch circuit that is coupled between the input node and a first switch node; and

        a first current mirror circuit, including:

            a first n-type transistor having at least a gate, a drain, and a source, wherein the drain of the first transistor is coupled to first switch node, and wherein the gate of the first transistor is coupled to the drain of the first transistor; and

            a second n-type transistor having at least a gate, a drain, and a source, wherein the gate of the second transistor is coupled to the gate of the first transistor, and wherein the drain of the second transistor is coupled to the first output node; and

        a second decoder circuit that is coupled to the input node and a second output node, wherein the second decoder circuit includes a second current mirror circuit, and wherein the second current mirror circuit includes a plurality of p-type transistors.

22. (Currently amended) A tri-level decoder circuit, comprising:

    a first decoder circuit that is coupled to an input node and a first output node, wherein the first decoder circuit includes:

        a first switch circuit that is coupled between the input node and a first switch node, wherein the first switch circuit is not part of a differential pair; and

        a first current mirror circuit having at least: an input that is coupled to the first switch node, and an output that is coupled to the first output node; and

        a second decoder circuit that is coupled to the input node and a second output node.

23. (Previously Presented) A tri-level decoder circuit, comprising:

a first decoder circuit that is coupled to an input node and a first output node, wherein the first decoder circuit includes:

    a first switch circuit that is coupled between the input node and a first switch node;  
and

    a first current mirror circuit having at least: an input that is coupled to the first switch node, and an output that is coupled to the first output node;

    a second decoder circuit that is coupled to the input node and a second output node; and  
    a non-linear filter circuit that is coupled between the first switch node and the first output node.